IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: John L. Margrave et al.	§	Serial No:	To Be Assigned
	§	Filed:	Herewith
For: CHEMICAL DERIVATIZATION OF SINGLE WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF, AND USE OF DERIVATIZED Nanotubes	§	Group Art Unit:	To Be Assigned
	§	Examiner:	To Be Assigned
Atty Dkt: 11321-P026US	§		

Assistant Commissioner for Patents
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CERTIFICATE OF MAILING (37 C.F.R. 1.10)

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Toni Stanley
Signature

TONI STANLEY
Printed Name

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3-16-2001
Date

PRELIMINARY AMENDMENT

Sir:

This paper is submitted concurrently with the above-referenced divisional application. No fee (other than the filing fee for the referenced application) is believed to be due in connection with this submission. However, if any fee is determined to be due, the Commissioner is hereby authorized to charge such fees in connection with this Application to Winstead Sechrest & Minick Deposit Account No. 23-2426/11321-P026US.

AMENDMENTS

Prior to examination on the merits, please amend the application as follows:

IN THE SPECIFICATION:

Please amend the specfication as follows:

Page 1, line 5, "BACKGROUND OF THE INVENTION," insert:

PRIORITY BENEFIT AND CROSS REFERENCE TO RELATED APPLICATIONS

This Application is a divisional application of U. S. Patent Application Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P013WOUS), filed concurrent to the date of this Application. this application claims priority benefits to U.S. Patent Application Serial No. 09/_____(Attorney Docket No. 11321-P013WOUS), and claims priority benefits to International Application No. PCT/US 99/21366, filed September 1999, which application claims priority benefits to United States Patent Application Nos. (1) 60/101,092, filed September 18, 1998; (2) 60/106,918 filed November 3, 1998; and (3) 60/138,505, filed June 10, 1999, all of which are hereby incorporated by reference.

The present invention is related to the following corresponding U.S. Patent Applications, all of which are divisionals of the U.S. Patent Application Serial No. 09/_____(Attorney Docket No. 11321-P013US):

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P025US), filed concurrent to the date of this Application;

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P027US), filed concurrent to the date of this Application;

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P028US), filed concurrent to the date of this Application; and

Serial No. 09/_____ "CHEMICAL DERIVATIZATION OF SINGLE-WALL CARBON NANOTUBES TO FACILITATE SOLVATION THEREOF; AND USE OF DERIVATIZED NANOTUBES TO FORM CATALYST-CONTAINING SEED MATERIALS FOR USE IN MAKING CARBON FIBERS" to Margraves et al., (Attorney Docket No. 11321-P029US), filed concurrent to the date of this Application.

IN THE CLAIMS:

Please delete claims 1-51 without prejudice or disclaimer.

Please add new claims 52-96 listed below.

52. (New) A single wall carbon nanotube having one or more substituents covalently bonded to a sidewall of the single wall carbon nanotube.

53. (New) The single wall carbon nanotube of claim 52, wherein the substituents are selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', wherein R' is selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic carbon chain.

54. (New) The single wall carbon nanotube of claim 53, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with at least one heteroatom.

55. (New) The single wall carbon nanotube of claim 53, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an aminoalkyl , an amino acid, and a peptide of 2-8 amino acids.

56. (New) The single wall carbon nanotube of claim 52, wherein the substituents are alkyl or phenyl.

57. (New) The single wall carbon nanotube of claim 52, further comprising metal complexed to at least one of the substituents.

58. (New) The single wall carbon nanotube of claim 57, wherein the metal is selected from the group consisting of Group VI B metals and Group VIII B metals.

59. (New) The single wall carbon nanotube of claim 52, wherein the amount of substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

60. (New) The single wall carbon nanotube of claim 59, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

61. (New) The single wall carbon nanotube of claim 60, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

62. (New) A product made by the process of covalently bonding substituents to carbon atoms on a sidewall of the single wall carbon nanotube.

63. (New) The product of claim 62, wherein the substituents are selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', wherein R' is selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic carbon chain.

64. (New) The product of claim 63, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with at least one heteroatom.

65. (New) The product of claim 63, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

66. (New) The product of claim 62, wherein the substituents are selected from the group consisting of fluorine, alkyl and phenyl.

67. (New) The product of claim 62, further comprising the step of complexing a metal to at least one of the substituents.

68. (New) The product of claim 67, wherein the metal is selected from the group consisting of Group V I B metals and Group VIII B metals.

69. (New) The product of claim 62, wherein the amount of substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

70. (New) The product of claim 69, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

71. (New) The product of claim 70, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

72. (New) A product made by the process comprising:

(a) fluorinating a single wall carbon nanotube;

(b) reacting the fluorinated single wall carbon nanotube with a compound containing a substituent to covalently bond the substituents to the single wall carbon nanotube.

73. (New) The product of claim 72, wherein the substituents are selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', a linear carbon chain, a cyclic carbon chain, and peptide, wherein R' is selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic carbon chain.

74. (New) The product of claim 73, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with at least one heteroatom.

75. (New) The product of claim 73, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

76. (New) The product of claim 72, wherein the substituents are alkyl or phenyl.

77. (New) The product of claim 72 made by the process further comprising the step of complexing a metal to at least one of the substituents.

78. (New) The product of claim 77, wherein the metal is selected from the group consisting of Group VI B metals and Group VIII B metals.

79. (New) The product of claim 72, wherein the amount of substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

80. (New) The product of claim 79, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

81. (New) The product of claim 80, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

82. (New) The product of claim 72, wherein said step of fluorinating the single wall carbon nanotube comprises exposing the single wall carbon nanotube to a fluorinating agent.

83. (New) The product of claim 82, wherein the fluorinating agent is selected from the group consisting of fluorine, ClF_3, BrF_3, IF_5, XeF_2, XeF_4, AgF_2, and MnF_3.

84. (New) The product of claim 82, wherein the fluorinating step occurs at a reaction temperature up to about 500°C.

85. (New) The product of claim 82, wherein the reaction temperature is between about 250°C and about 400°C.

86. (New) A derivatized single wall carbon nanotube made by the process comprising the steps of:

(a) reacting the single wall carbon nanotube with a fluorinating agent;

(b) solvating the single wall carbon nanotube from step (i); and

(c) reacting the fluorinated single wall carbon nanotube with a compound containing a substituent to covalently bond the substituent to the single wall carbon nanotube.

87. (New) The derivatized single wall carbon nanotube of claim 86, wherein the substituents are selected from the group consisting of alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, hydroxy, and OR', wherein R' is selected from the group consisting of hydrogen, alkyl, acyl, aryl, aralkyl, halogen, substituted thiol, unsubstituted thiol, substituted amino, unsubstituted amino, a linear carbon chain, and a cyclic carbon chain.

88. (New) The derivatized single wall carbon nanotube of claim 87, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with at least one heteroatom.

89. (New) The derivatized single wall carbon nanotube of claim 87, wherein the linear carbon chain or the cyclic carbon chain or both is substituted with one or more of the group consisting of =O, =S, hydroxy, an aminoalkyl, an amino acid, and a peptide of 2-8 amino acids.

90. (New) The derivatized single wall carbon nanotube of claim 86, wherein the fluorinating agent is selected from the group consisting of fluorine, ClF_3, BrF_3, IF_5, XeF_2, XeF_4, AgF_2, and MnF_3.

91. (New) The derivatized single wall carbon nanotube of claim 86, wherein the solvation step comprises sonication.

92. (New) The derivatized single wall carbon nanotube of claim 86, wherein the solvation step comprises using a solvent selected from the group consisting of an alcohol, $CHC1_3$, and dimethylformamide.

93. (New) The derivatized single wall carbon nanotubes of claim 92, wherein the alcohol is selected from the group consisting of methanol, ethanol, 2,2,2-trifluoroethanol, 2-propanol, 2-butanol, n-pentanol, n-hexanol, cyclohexanol and n-heptanol.

94. (New) The derivatized single wall carbon nanotube of claim 86, wherein the amount of substituent bonded to carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about 26 carbon atoms to (b) one substituent to about two carbon atoms.

95. (New) The derivatized single wall carbon nanotube of claim 94, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at a substituent to carbon ratio of from (a) one substituent to about ten carbon atoms to (b) one substituent to about two carbon atoms.

96. (New) The derivatized single wall carbon nanotube of claim 95, wherein the amount of substituent bonded to the carbon atoms of the single wall carbon nanotube is at the substituent to carbon ratio of from (a) one substituent to about three carbon atoms to (b) one substituent to about two carbon atoms.

Respectfully submitted,

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